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James R Duzan Trask Britt & Rossa P O Box 2550 Salt Lake City, UT 84110			GRAYBILL, DAVID E	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/544,822

Applicant(s)

JIANG, TONGBI

Examiner

David E. Graybill

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-64 is/are pending in the application.
- 4a) Of the above claim(s) 33-57 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-32 and 58-64 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

In the rejections infra, generally, reference labels are recited only for the first recitation of identical claim elements.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 58-61 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Yamada (5959363).

At column 56, line 12 to column 58, line 24, Yamada discloses the following:

A method for attaching a semiconductor assembly, said method comprising: providing a semiconductor device 201 having an active surface; providing a substrate 202 having an upper surface; applying a liquid wetting agent layer 205 to one of said active surface of said semiconductor device and said upper surface of said substrate; connecting said semiconductor device to said substrate so that said active surface of said semiconductor

device faces said upper surface of said substrate; and applying a flowable underfill material 206 between the substrate and the semiconductor device, such that said flowable underfill material contacts said applied wetting agent layer "coupling agent"; wherein applying said wetting agent layer comprises a dispensing "screen printing" method; wherein said wetting agent layer comprises at least one layer; wherein said wetting agent layer comprises a silane-based material.

To further clarify the disclosure of a liquid wetting agent layer 205, as cited, Yamada discloses "these components being . . . molten . . . was coated on surface of the wiring circuit board . . . thereby forming a second encapsulation resin layer 205." Furthermore, Yamada discloses "The coating method of this second encapsulation resin [205] may be arbitrarily selected." In addition, as cited, Yamada discloses that the disclosure that a coating method of "encapsulation resin may be arbitrarily selected" includes "screen printing," and, screen printing of encapsulation resin inherently requires liquid encapsulation resin.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject

matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 7-12, 15, 22, 62 and 64 are rejected under 35 U.S.C.

103(a) as being unpatentable over the combination of Yamada (5959363), Schultz (6350840) and Pluddemann (4961967).

At column 53, line 66 to column 56, line 11; and column 59, line 34 to column 60, line 53, Yamada discloses the following:

A method for applying a material between a semiconductor device having a surface and a substrate having a surface, said method comprising: applying a liquid wetting agent layer to one of said surface of said semiconductor device and said surface of said substrate; and applying a flowable underfill material between the substrate and the semiconductor device, such that said flowable material contacts said wetting agent layer; wherein said semiconductor device is attached to said substrate; wherein said applying said liquid wetting agent layer comprises a dispensing method; wherein said liquid wetting agent layer comprises at least one layer; wherein said liquid wetting agent layer comprises a plurality of layers; wherein said applying a liquid wetting agent layer comprises providing a material that to

the surface of one of said surface of said semiconductor device and said surface of said substrate for the application of an underfill material.

A method for applying a material between a semiconductor device and a substrate, said method comprising: providing a semiconductor device having an active surface, another surface, a first end, a second end, a first lateral side, and a second lateral side, said first end, said second end, said first lateral side, and said second lateral side forming at least a portion of a periphery of said semiconductor device; providing a substrate having an upper surface, a first side wall, a second side wall, a first lateral side wall and a second lateral side wall; applying a liquid wetting agent layer to one of said active surface of said semiconductor device and said upper surface of said substrate; and applying a flowable underfill material between said semiconductor device and said substrate, such that said flowable material contacts said applied wetting agent layer; wherein said flowable material is applied substantially adjacent to at least one end of said semiconductor device; wherein said flowable material substantially fills a gap between said semiconductor device and said substrate; wherein said flowable material is provided substantially adjacent to said at least a portion of the periphery of said semiconductor device to fill a gap between said substrate and said

semiconductor device; wherein said applying said flowable material comprises: providing said flowable material substantially adjacent said first end of said semiconductor device for filling between said substrate and said semiconductor device by one or more forces acting upon said flowable material.

A method for attaching a semiconductor assembly, said method comprising: providing a semiconductor device having an active surface, a first end, a second end, a first lateral side end and a second lateral side end; providing a substrate having an upper surface, a first side wall, a second side wall, a first lateral side wall and a second lateral side wall; applying a silane-comprising material layer to one of a portion of said active surface of said semiconductor device and a portion of said upper surface of said substrate; connecting said semiconductor device to said substrate so that said active surface of said semiconductor device faces said upper surface of said substrate; and applying a flowable underfill material between said semiconductor device and said substrate, such that said flowable underfill material contacts said applied silane-comprising material layer.

A method for applying a material between a semiconductor device having a surface and a substrate having a surface, said semiconductor

device mounted on said substrate, said method comprising: applying a essentially uniform liquid silane-comprising wetting agent layer inherently having a total thickness to at least one of said surface of said semiconductor device and said surface of said substrate; and applying a flowable underfill material between the substrate and the semiconductor device separately from said liquid silane-comprising wetting agent layer, such that said flowable material contacts said wetting agent layer.

To further clarify, Yamada discloses wherein said liquid wetting agent layer comprises a plurality of layers because, as cited, Yamada discloses, "205, a second resin constituting a laminate of encapsulation resin," and, "a second encapsulation resin layer 205," and, "it is well settled that the term 'a' or 'an' ordinarily means 'one or more'." *Tate Access Floors, Inc., and Tate Access Floors Leasing, Inc., v. Interface Architectural Resources, Inc.*, 279 F.3d 1357; 2002 U.S. App. LEXIS 1924; 61 U.S.P.Q.2D (BNA) 1647 ((citing *Tate Access Floors, Inc. v. Maxcess Techs., Inc.*, 222 F.3d 958, 966 n.4, 55 U.S.P.Q.2D (BNA) 1513, 1518 [**32] (citing *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 977, 52 U.S.P.Q.2D (BNA) 1109, 1112 (Fed. Cir. 1999): "As we have previously explained, it is generally accepted in patent parlance that 'a' or 'an' can mean 'one or more'."))). And, "This court has

repeatedly emphasized that an indefinite article 'a' or 'an' in patent parlance carries the meaning of 'one or more' in open-ended claims containing the transitional phrase 'comprising.' Unless the claim is specific as to the number of elements, the article 'a' receives a singular interpretation only in rare circumstances when the patentee evinces a clear intent to so limit the article." (Citations omitted). *Scanner Technologies v. COS Vision Systems*, 365 F.3d 1299, 1304 (Fed. Cir. 2004).

However, Yamada does not appear to explicitly disclose the particular claimed layer thickness.

Notwithstanding, as reasoned from well established legal precedent, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose this particular thickness because applicant has not disclosed that, in view of the applied prior art, the thickness is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical. For that matter, applicant has not disclosed that the thickness is for **any** purpose or produces **any** result. Moreover, it appears prima facie that the process would possess utility using another thickness. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a

disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Also, Yamada does not appear to explicitly disclose that the underfill material is a thermoplastic material.

Nevertheless, as cited, Yamada discloses that the underfill material is a thermosetting material, and that, as disclosed at column 70, lines 8-14 and 62, the underfill material is not limited to thermosetting material. In addition, at column 1, line 32 to column 4, line 63, Schultz discloses a thermoplastic underfill material that is superior to thermosetting underfill material. Hence, it would have been obvious to combine this disclosure of Schultz with the disclosure of Yamada because it would provide a reworkable underfill that is superior to the thermosetting underfill of Yamada.

Also, Yamada and Schultz do not appear to explicitly disclose that said flowable material contacts said liquid wetting agent layer; wherein said liquid wetting agent layer includes a layer of silane-based (defined as a silane main

ingredient) material; said flowable material contacts said applied liquid wetting agent layer; and a silane-based wetting agent layer.

Regardless, as cited, Yamada discloses that "other adhesion assistants [wetting agent layers] may also be coated." Also, at column 1, third full paragraph, Pluddemann (in Plueddemann (4231910), incorporated by reference, at column 1, lines 5-8, 21-23 and 55-63; column 2, lines 5-49; column 3, lines 22-54; column 3, line 65 to column 4, line 10; column 4, lines 24-27 and 58-62; column 6, lines 11-19, 37-44 and 57-65; and column 7, line 4 to column 8, line 5) discloses that a flowable material contacts a liquid wetting agent layer; wherein the liquid wetting agent layer includes a layer of silane-based material; and a silane-based wetting agent layer. In addition, it would have been obvious to combine this disclosure of Pluddemann with the disclosure of Yamada and Schultz because it would provide the "other adhesion assistants" of Yamada having improved wetting to the thermoplastic underfill material of Yamada and Schultz. Furthermore, the wetting agent layers of Pluddemann and Yamada, including the "other adhesion assistants" of Yamada, are at least alternatives; therefore, as reasoned from well established legal precedent, it would have been obvious to substitute or combine the liquid wetting agent layer of Pluddemann for or

with the wetting agent layer of Yamada. See *In re May* (CCPA) 136 USPQ 208 (It is our opinion that the substitution of Wille's type seal for the cement of Hallauer in Figure 1 would be obvious to persons of ordinary skill in the art from the disclosures of these references, merely involving an obvious selection between known alternatives in the art and the application of routine technical skills.); *In re Cornish* (CCPA) 125 USPQ 413; *In re Soucy* (CCPA) 153 USPQ 816; *Sabel et al. v. The Wickes Corporation et al.* (DC SC) 175 USPQ 3; *Ex parte Seiko Koko Kabushiki Kaisha Co.* (BdPatApp&Int) 225 USPQ 1260; and *Ex parte Rachlin* (BdPatApp&Int) 151 USPQ 56. See also *Smith v. Hayashi*, 209 USPQ 754 (Bd. of Pat. Inter. 1980) (However, there was evidence that both phthalocyanine and selenium were known photoconductors in the art of electrophotography. "This, in our view, presents strong evidence of obviousness in substituting one for the other in an electrophotographic environment as a photoconductor." 209 USPQ at 759.). An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982). "It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be

used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art." In re Kerkhoven, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980) (citations omitted). "For example, where a claimed apparatus requiring Phillips head screws differs from a prior art apparatus describing the use of flathead screws, it might be hard to find motivation to substitute flathead screws with Phillips head screws to arrive at the claimed invention. However, the prior art would make it more than clear that Phillips head screws and flathead screws are viable alternatives serving the same purpose. Hence, the prior art would 'suggest' substitution of flathead screws for Phillips head screws albeit the prior art might not 'motivate' use of Phillips head screws in place of flathead screws. Ex parte Jones, 62 USPQ2d 1206 (BdPatApp&Int 2001). See also In re Crockett, 279 F.2d 274, 126 USPQ 186 (CCPA 1960); Ex parte Quadranti, 25 USPQ2d 1071 (Bd. Pat. App. & Inter. 1992).

In the alternative, claim 64 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada, Schultz and Pluddemann as applied to claim 64 supra, and further in combination with Hieda (6303277).

Yamada does not appear to disclose literally the layer 205 having a thickness of about a monolayer.

Nonetheless, at column 3, line 64 to column 4, line 5; and column 5, lines 41-51, Hieda discloses literally a layer 2 having a thickness of about a monolayer. Furthermore, it would have been obvious to combine this disclosure of Hieda with the disclosure of the applied prior art because it would enable obtainment of a high resolution layer pattern.

Claim 63 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada as applied to claim 61, and further in combination with Schultz (6350840) and Pluddemann (4961967).

Yamada does not appear to explicitly disclose that the underfill material is a thermoplastic material.

Nevertheless, as cited, Yamada discloses that the underfill material is a thermosetting material, and that, as disclosed at column 70, lines 8-14 and 62, the underfill material is not limited to thermosetting material. In addition, at column 1, line 32 to column 4, line 63, Schultz discloses a thermoplastic underfill material that is superior to thermosetting underfill material. Hence, it would have been obvious to combine this disclosure of

Schultz with the disclosure of Yamada because it would provide a reworkable underfill that is superior to the thermosetting underfill of Yamada.

Also, Yamada and Schultz do not appear to explicitly disclose wherein said liquid wetting agent layer comprises one of glycidoxypropyltrimethoxysilane and ethyltrimethoxysilane.

Regardless, as cited, Yamada discloses that "other adhesion assistants [wetting agent layers] may also be coated." Also, as cited supra, Pluddemann discloses wherein a liquid wetting agent layer comprises one of glycidoxypropyltrimethoxysilane and ethyltrimethoxysilane. In addition, it would have been obvious to combine this disclosure of Pluddemann with the disclosure of Yamada and Schultz because it would provide the "other adhesion assistants" of Yamada having improved wetting to the thermoplastic underfill material of Yamada and Schultz.

Furthermore, the wetting agent layers of Pluddemann and Yamada, including the "other adhesion assistants" of Yamada, are at least alternatives; therefore, as reasoned from well established legal precedent, it would have been obvious to substitute or combine the liquid wetting agent layer of Pluddemann for or with the wetting agent layer of Yamada.

Claims 13, 14, 16-21 and 23-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada, Schultz and Pluddemann as applied to claim 10, and further in combination with Akram (5766982).

Yamada, Schultz and Pluddemann do not appear to explicitly disclose the following:

The method wherein said substrate includes an aperture extending through said substrate; wherein said aperture is located adjacent to said another surface of said semiconductor device, further comprising: elevating at least said first side wall of said substrate and said first end of said semiconductor device; wherein said elevating said first side wall of said substrate comprises placing said substrate on a support structure and elevating at least one portion of said support structure, further comprising: providing a dam on the substrate adjacent to at least one of said first end, said second end, said first lateral side and said second lateral side of said semiconductor device; wherein said dam extends to substantially between said semiconductor device and said substrate, further comprising: vibrating one of said semiconductor device and said substrate; wherein said vibrating one of said semiconductor device and said substrate comprises placing said substrate on a support structure and vibrating said support structure;

wherein said substrate includes at least one aperture extending through said substrate and substantially located adjacent to said another surface of said semiconductor device; wherein said flowable material is provided through said at least one aperture of said substrate substantially filling a gap between said substrate and said semiconductor device; wherein said substrate includes at least one aperture extending therethrough and substantially located adjacent to said another surface of said semiconductor device; wherein said flowable material is provided from below said substrate; and wherein said flowable material is provided through said at least one aperture contacting at least a portion of said another surface of said semiconductor device.

Nevertheless, at column 4, line 36 to column 7, line 17, Akram discloses a process wherein a substrate 10 includes an aperture extending through a substrate, an aperture 60 is located adjacent (nearby) to another surface of a semiconductor device 12; elevating at least a first side wall of the substrate and a first end of the semiconductor device; wherein elevating a first side wall of the substrate comprises placing the substrate on a support structure 44 and elevating at least one portion of a support structure; providing a dam 40 on the substrate adjacent to at least one of a

first end, a second end, a first lateral side and a second lateral side of a semiconductor device; wherein a dam extends to substantially between a semiconductor device and a substrate; vibrating 48 one of a semiconductor device and a substrate; wherein vibrating one of a semiconductor device and a substrate comprises placing a substrate on a support structure and vibrating a support structure; wherein a flowable material 28 is provided through at least one aperture of a substrate substantially filling a gap 26 between a substrate and a semiconductor device; wherein the flowable material is provided from below the substrate; and wherein a flowable material is provided through at least one aperture contacting (at least indirectly physically and thermally contacting) at least a portion of another surface of a semiconductor device. Moreover, it would have been obvious to combine this disclosure of Akram with the disclosure of the applied prior art because it would facilitate applying the flowable material 206 between the substrate and the semiconductor device.

Also, in the combination, Yamada discloses the method wherein applying a flowable material comprises: providing the flowable material substantially adjacent to the first end of the semiconductor device for filling the gap between the substrate and the semiconductor device; wherein said

applying said flowable material comprises: providing said flowable material substantially adjacent to said first end and one of said first lateral side and said second lateral side of said semiconductor device for filling the gap between said substrate and said semiconductor device.

Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada, Shultz and Pluddemann as applied to claim 10, and further in combination with Banerji (5203076).

Yamada, Shultz and Pluddemann do not appear to explicitly disclose wherein said applying said flowable material between said semiconductor device and said substrate further comprises placing said semiconductor device and said substrate in a chamber, said chamber having an atmosphere therein having a variable pressure, further comprising: varying the pressure of said atmosphere in said chamber for said flowable material substantially filling a gap between said semiconductor device and said substrate.

Regardless, at column 2, lines 55-68; and column 3, lines 1-10, Banerji discloses wherein applying a flowable material 22 between a semiconductor device 10 and a substrate 20 comprises placing the semiconductor device and the substrate in a chamber 32 having an atmosphere therein having a variable pressure, and varying the pressure of

the atmosphere in the chamber for the flowable material substantially filling a gap 18 between the semiconductor device and the substrate.

Furthermore, it would have been obvious to combine this disclosure of Banerji with the disclosure Yamada, Pluddemann and Shultz because it would facilitate applying the flowable material 206 between the substrate and the semiconductor device.

Applicant's amendment and remarks filed 8-14-6 have been fully considered and are treated *supra* and *infra*.

Applicant contends "Yamada et al. does not describe applying a wetting agent or essentially uniform liquid silane-based wetting agent layer having a thickness of about a monolayer to at least one of said surface of said semiconductor device and said surface of said substrate whatsoever.

This contention is respectfully deemed unpersuasive and traversed because Yamada is not necessarily applied to the rejection for a disclosure of a thickness of about a monolayer. Furthermore, as elucidated in the rejection Yamada discloses applying a wetting agent or essentially uniform liquid silane-based wetting agent layer to at least one of said surface of said semiconductor device and said surface of said substrate.

In addition, applicant "asserts that an underfill material is clearly a thermo-setting material, not a thermo-plastic material."

This assertion is respectfully traversed because as elucidated in the rejection Schultz explicitly discloses "thermoplastic" "underfill."

Also, applicant " asserts that any combination of the Yamada et al. reference, the Schulz et al. reference, and the Plueddeman reference fails to teach or suggest the claim limitations of independent claims 1, 10, 62 and 64 calling for 'applying a liquid wetting agent layer to one of said surface of said semiconductor device and said surface of said substrate', 'applying a flowable underfill material between the substrate and the semiconductor device, such that said flowable material contacts said liquid wetting agent layer', 'applying a liquid wetting agent layer to one of said active surface of said semiconductor device and said upper surface of said substrate', 'applying a liquid wetting agent layer to one of said active surface of said semiconductor device and said upper surface of said substrate', 'applying a silane-based material layer to one of a portion of said active surface of said semiconductor device and a portion of said upper surface of said substrate', 'applying a flowable underfill material between said semiconductor device and said substrate, such that said flowable underfill material contacts said

applied silane-based material layer', 'applying a essentially uniform liquid wetting agent layer having a thickness of about a monolayer to at least one of said surface of said semiconductor device and said surface of said substrate', 'applying a flowable underfill material between the substrate and the semiconductor device separately from said liquid wetting agent layer, such that said flowable material contacts said wetting agent layer', 'applying a essentially uniform liquid silane-based wetting agent layer having a total thickness of about a monolayer to at least one of said surface of said semiconductor device and said surface of said substrate' and 'applying a flowable underfill material between the substrate and the semiconductor device separately from said liquid silane-based wetting agent layer, such that said flowable material contacts said wetting agent layer'," and, "any combination of the Yamada et al. reference, the Schulz et al. reference, the Plueddeman reference and the Hieda et al. reference fails to teach or suggest the claim limitations of independent claim 64 calling for 'applying a essentially uniform liquid silane-based wetting agent layer having a total thickness of about a monolayer to at least one of said surface of said semiconductor device and said surface of said substrate' and 'applying a flowable underfill material between the substrate and the semiconductor

device separately from said liquid silane-based wetting agent layer, such that said flowable material contacts said wetting agent layer'."

These assertions are respectfully traversed because, as elucidated in the rejection, the applied prior art discloses these limitations.

Also, applicant alleges "the Yamada et al. reference cannot teach or suggest the use of a thermo-plastic underfill because a thermo-plastic underfill would soften with an increase of temperature when the IC chip is being operated so that the thermo-plastic underfill would be unable to compensate for any thermal mismatch between IC chip and the IC carder thereby making the Yamada et al. invention inoperable due to the thermo-plastic material loosing its strength as it is heated thereby allowing the IC chip to separate from the substrate as the bump electrodes 203 fail in shear due to the thermo-plastic material carrying no load. Additionally, thermo-plastic materials have too high viscosity to be used as underfill materials as they are unable to effectively fill the small space between an IC chip mounted on an IC chip carrier using solder balls where the small space is 125 microns or less in height," and, "applicant asserts that the sole teaching or suggestion for the use of a liquid wetting agent on one of the active surface of said semiconductor device and a portion of said upper surface of

said substrate for use with an underfill material is solely the Applicant's disclosure because the cited prior art teaches away from any combination thereof, because if the prior art is combined as suggested in the rejection, the combination clearly destroys the operability of the primary reference and because the cited prior art does not contain any suggestion for any combination thereof. Solely Applicant's disclosure contains any such suggestion as evidenced by the attempt to combine the cited prior art in a rejection which destroys the invention of the Yamada et al. reference."

These allegations are respectfully deemed unpersuasive because they are unsupported by proof or a showing of facts; hence, they essentially amounts to mere conjecture and they are of no probative value. See MPEP 716.01(c), and, *Ex parte Gray*, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989) (statement in publication dismissing the "preliminary identification of a human b - NGF - like molecule" in the prior art, even if considered to be an expert opinion, was inadequate to overcome the rejection based on that prior art because there was no factual evidence supporting the statement); *In re Beattie*, 974 F.2d 1309, 24 USPQ2d 1040 (Fed. Cir. 1992) (declarations of seven persons skilled in the art offering opinion evidence praising the merits of the claimed invention were found to have little value because of a

lack of factual support); Ex parte George, 21 USPQ2d 1058 (Bd. Pat. App. & Inter. 1991) (conclusory statements that results were "unexpected," unsupported by objective factual evidence, were considered but were not found to be of substantial evidentiary value). Moreover, proper rationale to combine the references is elucidated in the rejections.

In addition, applicant "asserts that the substitution of a liquid primer composition from the Plueddeman reference for a resin of the Yamada et al. reference cannot be the substitution of an equivalent. Applicant asserts that one of ordinary skill in the art would not use a liquid primer composition used with thermo-plastic resins for use with thermo-setting plastics of Yamada et al."

These assertions are respectfully deemed unpersuasive because the prior art is not necessarily applied to the rejections for these disclosures.

Also, Applicant asserts the one of ordinary skill in the art would not substitute either the thermo-plastic resin of the Schultz et al. reference or the liquid primer composition from the Plueddeman reference to be separately applied to the IC chip and/or IC carrier of the Yamada et al. reference.

This assertion is respectfully deemed unpersuasive because the prior art is not necessarily applied for a disclosure that one of ordinary skill in the art would substitute either the thermo-plastic resin of the Schultz et al. reference or the liquid primer composition from the Plueddeman reference to be separately applied to the IC chip and/or IC carrier of the Yamada et al. reference. In any case, proper rationale to combine the references is elucidated in the rejections.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

For information on the status of this application applicant should check PAIR:

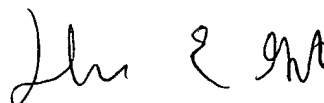
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alternatively, applicant may contact the File Information Unit at (703) 308-2733. Telephone status inquiries should not be directed to the examiner. See MPEP 1730VIC, MPEP 203.08 and MPEP 102.

Any other telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (571) 272-1930. Regular office hours:

Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is (571) 273-8300.



David E. Graybill
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Art Unit 2822

D.G.
17-Oct-06